

REMARKS

Claims 1 and 3-21 are pending in this application. Applicants note that in this response no claims are being amended, cancelled, or added.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the following remarks.

Claim Rejections under 35 U.S.C. § 103(a) over Kita

The Office Action rejects claims 1, 3, 4, 19, and 21 under 35 U.S.C. § 103(a) as being unpatentable over Kita (Japanese Publication No. 01-265454). The rejection is respectfully traversed.

M.P.E.P. § 2142 provides that "to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." Furthermore, if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Kita discloses a lithium cell, wherein manganese dioxide is processed with an ester shown in formula I or formula II suppressing the reaction of manganese dioxide and propylene carbonate. Abstract.

In contrast, independent claims 1 and 19 recite an organic electrolytic solution comprising, inter alia, a lithium salt; an organic solvent; and an oxalate compound of

formula (1), and wherein the amount of the oxalate compound of said formula (1) is in a range of 0.001-10 parts by weight with respect to 100 parts by weight of the organic solvent. Claim 21 recites an organic electrolytic solution comprising, inter alia, a lithium salt; an organic solvent; and an oxalate compound of formula (1), wherein the oxalate compound of said formula (1) is selected from the group consisting of diethyl oxalate, dimethyl oxalate, dipropyl oxalate, dibutyl oxalate, and bis-(4-methylbenzyl) oxalate, and wherein the organic solvent is at least one selected from the group consisting of a polyglyme, a dioxolane, 2-fluorobenzene, 3-fluorobenzene, 4-fluorobenzene, dimethoxyethane, diethoxyethane, and sulfolane.

Applicants respectfully submit that Kita fails to disclose or suggest the combination of features recited in independent claims 1, 19, and 21.

More specifically, Kita fails to at least disclose or suggest that the amount of the oxalate compound of said formula (1) is in a range of 0.001-10 parts by weight with respect to 100 parts by weight of the organic solvent, as recited in independent claims 1 and 19.

Moreover, the Examiner's attention is directed to the specification:

The amount of the oxalate compound of formula (1) above is in a range of 0.001-10 parts by weight, preferably 0.05-1 parts by weight, with respect to 100 parts by weight of an organic solvent of the organic electrolytic solution. ***If the amount of the oxalate compound of formula (1) above is less than 0.001 parts by weight, the effect of the additive is trivial. If the amount of the oxalate compound of formula (1) above exceeds 10 parts by weight, the lifespan properties of batteries degrade.***

Page 6, lines 17-22 of the specification.

An organic electrolytic solution according to the present invention contains an ***oxalate compound of formula (1) above and thus stabilizes lithium metal and improves the conductivity of lithium ions.*** The organic electrolytic solution according to the present invention improves charging/discharging efficiency when used in lithium batteries having a lithium metal anode.

Especially when the organic electrolytic solution is used in lithium sulfur batteries, ***the oxalate compound forms a chelate with lithium ions and improves the ionic conductivity and the charging/discharging efficiency of the battery.*** In addition, ***due to the chelation of the lithium ions, negative sulfur ions remain free without interaction with lithium ions,*** are highly likely to dissolve in the electrolytic solution. As a result, ***a reversible capacity of sulfur is increased.***

Page 15, lines 22-32 of the specification.

Therefore, Applicants respectfully submit that the presently claimed 0.001-10 parts by weight of oxalate provides an unexpected advantage of increasing the reversible capacity of sulfur without causing the batteries to degrade.

Applicants further respectfully submit that Kita fails to disclose or suggest the presently claimed amount oxalate and the unexpected advantages resulting therefrom.

Furthermore, Kita discloses propylene carbonate. Abstract. However, Kita fails to at least disclose or suggest organic solvents selected from the group consisting of a polyglyme, a dioxolane, 2-fluorobenzene, 3-fluorobenzene, 4-fluorobenzene, dimethoxyethane, diethoxyethane, and sulfolane, as recited in independent claim 21.

Applicants respectfully submit that claims 1, 19, and 21 are patentable over Kita. Claims 3 and 4 depend from claim 1, and are patentable over Kita for at least the same reasons that claim 1 is patentable over Kita.

Therefore, for at least the above-noted reasons, Applicants respectfully request that the obviousness rejection of claims 1, 3, 4, 19, and 21 over Kita be withdrawn.

Claim Rejections under 35 U.S.C. § 103(a) over Kita in view of Chu

The Office Action rejects claims 5-18 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Kita in view of Chu et al. (U.S. Patent No. 6,030,720, hereinafter referred to as "Chu"). The rejection is respectfully traversed.

Chu is cited merely to illustrate that polyglymes and dioxolanes as solvents are art-recognized equivalents to carbonates. (See Office Action, Page 3).

Applicants respectfully submit that Kita's propylene carbonate is not interchangeable with or equivalent to the presently claimed organic solvents. Moreover, no motivation is provided in the Office Action for the alleged equivalence between Kita's propylene carbonate and the presently claimed organic solvents. Applicants further respectfully submit that without providing any factual basis, the Office Action merely asserts that Chu is relied upon to teach that polyglymes and dioxolanes as solvents are art-recognized equivalents to carbonates. It is respectfully submitted that the suggestion in the Office Action of equivalence between polyglymes and dioxolanes and carbonates does not take into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made, but includes knowledge gleaned only from Applicant's disclosure. Accordingly, such a reconstruction is improperly based on hindsight reasoning. See In re McLaughlin, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971); MPEP § 2145.

Chu is cited merely as disclosing organic solvents. Accordingly, as cited, Chu fails to cure the many above-noted deficiencies with respect to Kita.

Therefore, for at least the above-noted reasons, Applicants respectfully request that the obviousness rejection of claims 5-18 and 20 over Kita in view of Chu be withdrawn.

Conclusion

Applicants invite the Examiner to contact Applicants' representative at the telephone number listed below if any issues remain in this matter, or if a discussion regarding any portion of the application is desired by the Examiner.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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